National Institute of Environmental Health Sciences

Atlantic hurricanes and associated insurance loss potentials in future climate scenarios: Limitations of high-resolution AGCM simulations

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Abstract:

Potential future changes in tropical cyclone (TC) characteristics are among the more serious regional threats of global climate change. Therefore, a better understanding of how anthropogenic climate change may affect TCs and how these changes translate in socio-economic impacts is required. Here, we apply a TC detection and tracking method that was developed for ERA-40 data to time-slice experiments of two atmospheric general circulation models, namely the fifth version of the European Centre model of Hamburg model (MPI, Hamburg, Germany, T213) and the Japan Meteorological Agency/ Meteorological research Institute model (MRI, Tsukuba city, Japan, TL959). For each model, two climate simulations are available: a control simulation for present-day conditions to evaluate the model against observations, and a scenario simulation to assess future changes. The evaluation of the control simulations shows that the number of intense storms is underestimated due to the model resolution. To overcome this deficiency, simulated cyclone intensities are scaled to the best track data leading to a better representation of the TC intensities. Both models project an increased number of major hurricanes and modified trajectories in their scenario simulations. These changes have an effect on the projected loss potentials. However, these state-of-the-art models still yield contradicting results, and therefore they are not yet suitable to provide robust estimates of losses due to uncertainties in simulated hurricane intensity, location and frequency. [http://www.tellusa.net/index.php/tellusa/article/view/15672/html]

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES A2

Other Climate Scenario: A1B

Exposure :

weather or climate related pathway by which climate change affects health

Extreme Weather Event

Extreme Weather Event: Hurricanes/Cyclones

Geographic Feature: ☑

resource focuses on specific type of geography

Ocean/Coastal

Geographic Location: ☑

resource focuses on specific location

Non-United States, United States

Non-United States: Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Cost/Economic

Resource Type: ☑

format or standard characteristic of resource

Research Article

Socioeconomic Scenario: SES scenarios

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content